Request for Marine Mammal Protection Act Incidental Harassment Authorization

San Francisco Public Utilities Commission
Bay Division Pipeline Geophysical Study

Submitted by

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Planning Bureau
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To

National Marine Fisheries Service (NMFS)
Office of Protected Resources
1315 East-West Highway
Silver Spring, MD 20910-3226

March 2006

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1.0 Detailed Description of the Activity

The San Francisco Public Utilities Commission (SFPUC) is proposing to construct an underground trans-bay water pipeline (Bay Tunnel) south of the Dumbarton Bridge in South San Francisco Bay (Figure 1). Geotechnical data are needed to develop criteria for tunnel design and to assist the design team with key decisions on tunnel alignment, tunnel and shaft construction methods, and tunnel and shaft lining design. To collect the necessary data, field investigations consisting of core samples and geophysical surveys along the proposed alignment alternatives would be conducted. The proposed project is authorized under the General Conditions for Nationwide Permit (NWP) No. 6 for Survey Activities. This includes core sampling, seismic exploratory operations, and plugging of bore holes.

This specific IHA application involves the geophysical (seismic) aspect of the proposed geotechnical studies and includes 21 seismic sample transects. A total of 25 to 35 linear miles (40 to 56 km) of marine-based geophysical sampling would occur. The marine seismic reflection data would be collected along a series of lines that cross the Bay centered over the projected alignment (Figure 2). A centerline and four wing lines are planned. Cross lines, or tie lines, would be run perpendicular to the centerline and extend 200 to 500 meters beyond the alignment parallel lines, unless restricted by water depth or man-made obstructions. Water depths in the survey area range from roughly 45 feet (14 meters) in the deeper mid-Bay channel to about 6 to 8 feet (1.8 – 2.4 m) (at high tide) along the shore and in Newark Slough. Work would be conducted at high tide in the shallow nearshore areas.

Data would be collected from a small boat that tows a seismic energy source and a multichannel hydrophone. Two energy sources would be used, a “minisparker” and a “boomer”. An onboard generator powers the energy sources. The hydrophone contains multiple sensors that detect the seismic waves reflected from the water bottom and sub-sea floor sediments and rocks. The hydrophone is filled with inert silicon oil.

The survey boat would travel along predetermined survey lines using a differential global positioning (DGPS) system for navigation. The energy source is fired every ½ second (boomer) or 1 second (minisparker). Data received by the hydrophone are recorded with an onboard seismograph and laptop computer. Sound pressure level from a boomer operating at 350 joules is 204 dB re 1µPa-m rms, and from a minisparker ranges is 209 dB re 1µPa-m rms. Specifications for these pieces of equipment, including operating frequencies, can be found in Table 1. Figure 3 shows examples of the proposed equipment.

Table 1
Sound Pressure Levels from Geophysical Survey Equipment

System	Power	P(dB) rms re 1µPa-m	Source Depth (m)	Frequency (Hz)	Pulse Duration (milliseconds)	Reference	Link
Geopulse Boomer	350 Joules	204	1	750-3500	0.1	Fed Reg. Vol 67 No. 62 (usgs)	http://www.epa.gov/fedrgstr/EPA-IMPACT/2002/April/Day-01/i7813.htm
Squid Minisparker	1.5 kilojoules	209	1	150-2500	0.8	Fed Reg. Vol 67 No. 62 (usgs)	http://www.epa.gov/fedrgstr/EPA-IMPACT/2002/April/Day-01/i7813.htm

2.0 Dates, Duration, and Region of Activity

The proposed seismic study spans from Newark Slough and Plummer Creek adjacent to the Cargill Salt property in the east (Newark 7.5-minute USGS quad in the City of Newark), to the Ravenswood Baylands open space on the western shore of San Francisco Bay (Palo Alto 7.5-minute USGS quad in the City of East Palo Alto). The study would roughly parallel existing SFPUC trans-bay pipelines, approximately 1-mile south of the Dumbarton Bridge in South San Francisco Bay (Figure 2). Figure 2 shows the proposed survey transect lines and coverage area.

Marine seismic surveys would take approximately 8 to 10 days to perform. Because much of the survey area is in shallow water, the optimum time for operations would be in daylight during high tide periods. Low tide periods would restrict operations to the deeper water areas. In the Newark Slough and Plummer Creek areas, work would be restricted to the harbor seal non-pupping season (July 1-November 30). Work in the open Bay will be restricted to June 1 to November 30, primarily to avoid listed fish species. The ideal start date would occur during the summer/fall of 2006.

3.0 Species and Numbers of Marine Mammals in Area

The species of marine mammals that have been observed within the San Francisco Bay consist primarily of the Pacific harbor seal (*Phoca vitulina richardsi*), California sea lion (*Zalophus californicus*), and gray whale (*Eschrichtius robustus*). Other species that have been sighted infrequently and usually near the Golden Gate include the harbor porpoise (*Phocoena phocoena*), the southern sea otter *Enhydra lutris*), humpback whale (*Megaptera noveangliae*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopius jubatus*), and northern fur seal (*Callorhinus ursinus*). Because several of the above-listed species are infrequent, rare or seldom observed visitors to the southern portion of the San Francisco Bay, the following list below includes the most likely marine mammal species affected by the proposed seismic study:

a. Pacific harbor seal
b. California sea lion
c. Gray whale

4.0 Status and Distribution of the Affected Species

The species of marine mammals listed below are not afforded protection by the Endangered Species Act (ESA) of 1972, nor does NOAA's National Marine Fisheries Service (NMFS) consider them as a Species of Concern. Gray whales were delisted in 1994 from the ESA.

4.1 Pacific Harbor Seal

The harbor seal haul-out site closest to the project site is at Newark Slough. The haul-out is near the junction of Newark Slough and Plummer Creek, within the geophysical investigation area. Newark Slough is a continually used seal haul-out site, although it is used by lower numbers of harbor seals compared with Mowry Slough to the south and Yerba Buena Island and Castro Rocks in the North Bay.

Harbor seals are known to utilize Newark Slough as a pupping site (Harvey and Oates 2002) and up to 82 individuals have been documented hauling-out at that location on a single day. During a five-year survey period between 2000 and 2005 at Newark Slough, an average of 42 individuals were counted each year during the pupping season. At Mowry Slough, approximately 2 miles southeast of the proposed study area, an average of 279 individuals were counted hauling out each year during the pupping season over the same 5-year timeframe (pers. comm. DeAngelis 2006). Harbor seals have also been documented at other haul-out sites throughout the South Bay including Calaveras Point, Coyote Creek, Guadalupe Creek, Corkscrew Slough and Blair Island (URS 2003).

4.2 California Sea Lion

California sea lions breed off the Central and Southern California coastline. Once the pupping season is completed (May-June), male sea lions will migrate north and enter the San Francisco Bay. During winter anchovy and herring runs, 500+ sea lions can be observed hauled-out at pier 39 in San Francisco's Fisherman's Wharf (Goals Project 2000). Although California sea lions are mainly known for haul-out sites off the San Francisco and Marin shorelines within the Bay, it is possible for this species to forage in the South Bay area as well.

4.3 Gray Whale

In the past, gray whales have been seen irregularly in San Francisco Bay These individuals likely wandered off the migration route and found themselves inside the bay. The number of gray whales observed in the Bay increased in 1999 and 2000. The Sea Training Institute reported two grays in San Francisco Bay during 1999, one in May and one in June. They observed six individuals in the year 2000, three on 17 May, one on 22

May, and 2 on 23 May (some of these whales probably were observed multiple times). The Oceanic Society made an attempt to observe and record reported gray whales in the Bay during spring 2000. They observed gray whales apparently feeding in a number of areas around the Bay; however, most the whales were seen near the mouth of the Bay. A few gray whales were seen potentially foraging in areas south of the San Francisco Airport.

Gray whales would typically enter the Bay from December to May during their coastal migration period (though as described above at least one whale was sighted in the Bay in June). Since the seismic surveys are proposed to be conducted in the summer months, gray whales would not typically be expected in the Bay at this time. The recent observations of gray whales feeding in the Bay may be attributed to the gray whale population reaching carrying capacity and change in food supply in the North Pacific forcing whales to use other food sources, such as benthic invertebrates in the Bay (URS 2003).

5.0 Type of Incidental Taking Authorization Requested

The proposed surveys may result in "Take by incidental harassment only" (level B harassment). An Incidental Harassment Authorization (IHA) is requested. Harassment could be caused by short bursts of noise (not exceeding 210dB re 1μPa-m peak) from the equipment, and presence of human work activity in proximity to haul-out and foraging sites.

6.0 Number of Marine Mammals that may be Affected

Incidental harassment may occur as a result of sound pressure levels produced by the survey equipment (greater than 160 dB but less than 210dB) and may potentially affect a few individual adult harbor seals and possibly adult male sea lions in the area. Proposed seismic surveys at Newark Slough would begin in July, 2006, after the harbor seal pupping season. Within the last 5-years, individual harbor seals counted while hauling-out at the Newark Slough haulout site during the post-pupping season, when the proposed surveys would occur, have fluctuated between a maximum of 34 individuals in 2001 to a minimum of 10 individuals in 2005 (pers. comm. DeAngelis 2006). Numbers of harbor seals counted at the Newark Slough haulout site during May of 2001 and May 2002 (pupping season) ranged from 26 to 65 individuals.

7.0 The Anticipated Impact of the Activity Upon the Species or Stock

The only anticipated impacts would be a temporary disturbance caused by brief bursts of sound. This may alter behaviors and cause marine mammals to temporarily disperse from the area. Disturbance could also be caused by the presence of vessels, humans, etc. These disturbances would likely be temporary. Disturbances could cause animals to flush and possibly return or could result in temporary use of an alternate haul out site in the Bay area---but long term abandonment of the site is not likely because existing traffic noise, recreational boaters or other ambient noises already occur in the area and it is likely that

wildlife has become habituated to these sounds. In addition, proposed mitigation and work restrictions described in Section 11 should preclude abandonment of the site. Long-term impacts to the species are not expected.

8.0 Anticipated Impact on Subsistence Uses

No impacts to the availability of the species stock are expected as a result of the proposed project.

9.0 The Anticipated Impact of the Activity Upon the Habitat of the Marine Mammal Populations, and the Likelihood of Restoration of the Affected Habitat

No direct impacts to habitat are proposed for this project, thus no long-term impacts would occur to the habitat as a result of the proposed project. Therefore, no restoration of the habitat would be necessary.

10.0 The Anticipated Impact of the Loss or Modification of Habitat

There would be no loss or modification of the habitat as a result of the proposed project.

11.0 Impact Minimization Methods

The proposed marine geophysical study provides the least intrusive method to determine subsurface site characteristics. The study would be timed to minimize impacts in sensitive areas during breeding periods. The survey will use equipment that generates the smallest practical sound needed to obtain useful data.

Proposed avoidance measures would include:

1) Work only occurring during daylight hours (0700-1900 hours).

2) Seismic studies would not occur in the vicinity of Newark Slough or Plummer Creek during the harbor seal pupping season (March 1-June 30). Seismic studies would, however, occur over open water transects.

3) A safe zone would be strictly enforced. A marine mammal monitor would survey the area either from the survey boat or a separate vessel prior to the startup of equipment. Seismic surveys would not begin until no marine mammals (pinnipeds or cetaceans) are sighted within a designated “safe zone” for at least 15 minutes prior to the initiation of the energy source. The proposed safe zones for the equipment that would be used are a 30-meter radius for the Geopulse “boomer” system, and a 100-meter radius for the Squid “mini-sparker” system. These proposed safe zone distances are based upon studies conducted by the USGS (Barnhart 2001). This study measured distances at which sound pressure levels from boomers and minisparkers dropped below 160 dB (See Barnhart 2001, Attachment 1).

4) A qualified biological monitor would visually survey the area prior to the startup of the survey equipment.

12.0 Arctic Subsistence Uses, Plan of Cooperation

Not applicable. The proposed activity will take place in San Francisco Bay, and no activities will take place in or near a traditional Arctic subsistence hunting area.

13.0 Monitoring And Reporting

URS would develop a monitoring plan that would collect data for each distinct marine mammal species observed in the south Bay proposed project area during the period of the seismic surveys. Marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle would also be included.

The following information provides additional details for the proposed monitoring plan:

- Monitoring would be conducted by a qualified biologist approved by NMFS.
- Monitoring would occur prior to the 1st day of the survey, to establish baseline data.
- Monitoring would occur from a chase vessel during the 8-10 day survey period.
- Post-survey monitoring would occur for a period of one day upon completion of the seismic studies.
- A final report would be submitted to NMFS 90 days after completion of the proposed project.

14.0 Coordinating Research To Reduce And Evaluate Incidental Take

Marine mammal sightings during the surveys would be compiled and reported to NMFS at the end of the survey period. This information could be made available to regional, State and federal resource agencies, scientists, professors, and other interested private parties upon written request.

15.0 References

Barnhardt, Water. 2001. Geophysical surveys of Hawaiian coral reefs. Sound Waves (monthly newsletter) published by US Geological Survey. November.

Goals Project. 2000. Baylands ecosystem species and community profiles: life histories and environmental requirements of key plants, fish, and wildlife of the San Francisco Bay Area. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project, P.R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, CA

Harvey, J.T. and S. Oates. 2002. Counts of harbor seals in San Francisco Bay during spring 2002. Moss Landing Marine Laboratories. Moss landing, CA. Prepared for URS Corporation.

Kopec, D. and J. Harvey, 1995. Toxic Pollutants, Health Indices, and Pollution Dynamics of Harbor Seals in San Francisco Bay, 1989-91: Final Report. Moss Landing Marine Labs. Moss Landing, CA. October 10.

URS Corporation. 2003. Predicted changes in hydrodynamics, sediment transport, water quality and biotic communities. Final Technical Report. Proposed SFO Runway Reconfiguration Project. Prepared for the Federal Aviation Administration. June.

Personal Communication

DeAngelis, M. L. 2006. Newark and Mowry Slough results of the Richmond Bridge Harbor Seal Survey (RBHSS), a joint project of Caltrans and San Francisco State University. Marine Mammal Biologist, NOAA's National Marine Fisheries Service, Long Beach, CA

URS Corporation L:\Projects\Bay_Division_Pipeline\MXD\Current Working Documents\Location_Map.mxd Date: 3/27/2006 3:46:06 PM Name: kvhopper0

URS	Bay Division Pipeline 26815218	Map of San Francisco Bay California	Figure 1

N

NEWARK
VALVE HOUSE

FMC Corp

SAMTRANS
ROW

NEWARK SLOUGH

DUMBARTON
BRIDGE

DON EDWARDS
WILDLIFE
REFUGE

CARGILL BITTERN
PONDS

PLUMMER CREEK

EXISTING
BDPL 1 & 2

RAVENSWOOD
VALVE HOUSE

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8
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12
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LEGEND:

- SOUTH ALIGNMENT (5.08 MILES)
- SOUTH ALIGNMENT ALTERNATE (5.09 MILES)
- 19 — SURFACE GEOPHYSICAL TRAVERSE (SEISMIC REFLECTION)

APPROXIMATE SCALE

0 — 1/2 — 1 mile

URS

Project No. 26815218

SAN FRANCISCO PUBLIC UTILITIES COMMISSION BAY DIVISION PIPELINE RELIABILITY UPGRADE, BAY TUNNEL

LOCATION PLAN FOR SEISMIC SURVEY

FIGURE 2

Feb 28, 2006 – 8:22am
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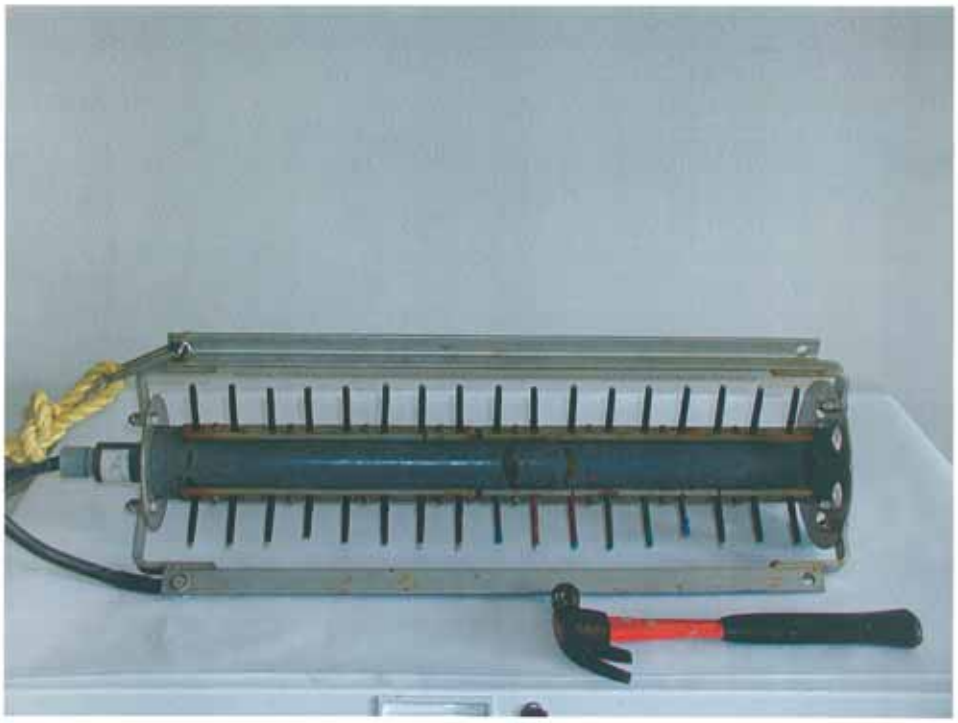

A. Minisparker

B. Boomer System

Figure 3. Examples of Proposed Seismic Survey Equipment

ATTACHMENT 1

Barnhardt 2001

USGS science for a changing world

125 years of science for America ★ ★ ★ ★ ★ 1879–2004

Sound Waves Monthly Newsletter
Coastal Science & Research News from Across the USGS

Fieldwork

Geophysical Survey of Hawaiian Coral Reefs

By Walter Barnhardt
November 2001

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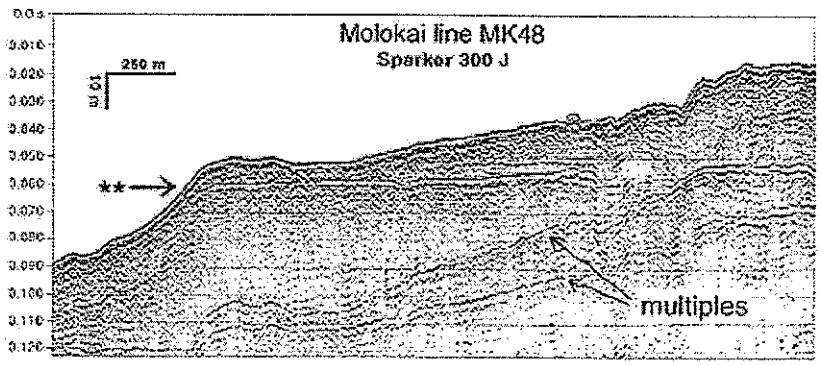
In early October, CMGP researchers from Menlo Park completed a two-week geophysical survey offshore from the Hawaiian Islands, where coral reefs are in decline. **Walter Barnhardt, Bruce Richmond, Pat Hart, Larry Kooker,** and **Mike Boyle** sailed on the R/V *Wailoa* with nearly every piece of high-resolution sub-bottom gear in the USGS arsenal (plus several systems that the USGS doesn't own).

Prior to the survey, and for the first time in the field, CMGP tested acoustic systems using a calibrated hydrophone as required under a permit from the National Marine Fisheries Service. The terms of the permit are meant to ensure that marine mammals are not harmed by research sound sources. Two days of testing determined the 160-dB safety zone for marine mammals, that is, the distance from the sound source at which the sound-pressure level had decreased to 160 decibels. The safe distances were 4 m for a Chirp system, 30 m for a boomer, and 100 m for a mini-sparker. If marine mammals were observed closer to the sound source than these distances, the system would have to be shut down and data collection temporarily halted. A team of three independent observers was on board to watch and warn of the approach of marine mammals. No whales were sighted and no shutdowns occurred.



Seismic-reflection profile across coral reef south of Molokai, Hawaii. The

Sound Waves
November 2001

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strong, flat-lying reflection (indicated by arrow at approximately 0.060 s) is continuous beneath large areas of the reef in this region.

The investigations focused on three study areas along the leeward coast of Molokai, and the windward and leeward coasts of Oahu (Mamala and Kailua Bays). The main objective was a better understanding of the geologic evolution of fringing reefs that have formed since the end of the last Ice Age. During that period, sea-level rise has flooded formerly exposed parts of older pre-Holocene reefs and generated a complex, three-dimensional structure of biogenic materials.

Coral reefs present special challenges for geologic studies. Reef growth is highly variable over small spatial scales, and widely spaced cores may not accurately resolve patterns of coral accumulation. With assistance from University of Hawaii researchers **Eric Grossman** (now with CMGP in Santa Cruz) and **Chip Fletcher**, we used seismic-reflection techniques to target and successfully image sections of a Holocene(?) reef up to 30 m thick. The most notable finding was the presence of a continuous, low-relief reflection that underlies extensive areas of reef off Molokai. Seismic profiles traced the buried surface parallel to shore for nearly the entire length of the island (approximately 40 km) and seaward to a depth of more than 130 m. As with any good science project, we returned home with as many new questions as answers. What is the nature of this marker horizon? Is it a wave-cut platform etched into older limestone? Are we imaging the upper surface of volcanic rocks? Planning is already underway on how to determine the acoustic velocities, compositions, and ages of the units that comprise Hawaiian reefs.

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